What is claimed is:

1. A method of producing particles using supercritical fluid (SCF) comprising:

providing a source of SCF;

providing a solution comprising:

at least one solvent that is at least partially soluble in the SCF;

at least one solute material that is at least partially soluble in the solvent and substantially insoluble in the SCF; and

at least one growth retardant compound that is at least partially soluble in the SCF and includes at least one functional group or portion that is SCF-philic and at least one functional group or portion that is SCF-phobic or solute material-philic; and

contacting the solution and the SCF together under conditions whereby the solvent diffuses into the SCF causing supersaturation and nucleation of particles comprising the solute material, said particles having a smaller size and a reduced amount of agglomeration than if no growth retardant compound was present.

2. The method according to claim 1 wherein the SCF is supercritical carbon dioxide.

3. The method according to claim 2 wherein the growth retardant compound is selected from the group consisting of sugar acetates, fluorocarbons and block copolymers.

4. The method according to claim 2 wherein the block copolymer is comprised of polymer blocks selected from the group consisting of polypropylene oxide, polyethylene oxide, poly methacrylic acid (PMMA), poly acrylic acid (PAA), poly vinyl acetate (PVA) and polyethylene oxide (PEO).

5. The method according to claim 1 wherein the solute material is selected from the group consisting of medicinal agents, biologically active materials, sugars, viral materials, diagnostic aids, nutritional materials, proteins, peptides, animal extracts, plant extracts and combinations thereof.

6. The method according to claim 5 wherein the solution further comprises a second solute material selected from the group consisting of polymers, fillers, disintegrants, binders, solubilizers, excipients, and combinations thereof. In particular, the matrix materials can be, for example, polysaccharides, polyesters, polyethers, polyanhydrides, polyglycolides (PLGA), polylactic acids (PLA), polycaprolactones (PCL), polyethylene glycols (PEG), polypeptides and combinations thereof.

7. The method according to claim 6 wherein the particles have an average particle size of less than 10 micron and more than 300 nm.

8. A method of producing particles using supercritical fluid (SCF) comprising:

providing a source of SCF;

providing a solution comprising:

at least one solvent that is at least partially soluble in the SCF; and

at least one solute material that is at least partially soluble in the solvent and substantially insoluble in the SCF;

dissolving at least one growth retardant compound in the SCF, the growth retardant compound including at least one functional group or portion that is SCF-philic and at least one functional group or portion that is SCF-phobic or solute material-philic; and

contacting the solution and the SCF comprising the dissolved growth retardant compound together under conditions whereby the solvent diffuses into the SCF causing supersaturation and

nucleation of particles comprising the solute material, said particles having a smaller size and a reduced amount of agglomeration than if no growth retardant compound was present.

9. The method according to claim 8 wherein the SCF is supercritical carbon dioxide.

10. The method according to claim 9 wherein the growth retardant compound is selected from the group consisting of sugar acetates, fluorocarbons and block copolymers.

11. The method according to claim 10 wherein the block copolymer is comprised of polymer blocks selected from the group consisting of polypropylene oxide, polyethylene oxide, poly methacrylic acid (PMMA), poly acrylic acid (PAA), poly vinyl acetate (PVA) and polyethylene oxide (PEO).

12. The method according to claim 8 wherein the solute material is selected from the group consisting of medicinal agents, biologically active materials, sugars, viral materials, diagnostic aids, nutritional materials, proteins, peptides, animal extracts, plant extracts and combinations thereof.

13. The method according to claim 12 wherein the solution further comprises a second solute material selected from the group consisting of polymers, fillers, disintegrants, binders, solubilizers, excipients, and combinations thereof. In particular, the matrix materials can be, for example, polysaccharides, polyesters, polyethers, polyanhydrides, polyglycolides (PLGA), polylactic acids (PLA), polycaprolactones (PCL), polyethylene glycols (PEG), polypeptides and combinations thereof.

14. The method according to claim 13 wherein the particles have an average particle size of less than 10 micron and more than 300 nm.

15. A method of producing particles using supercritical fluid (SCF) comprising:

providing a source of SCF;

dissolving at least one solute material and at least one growth retardant compound in the SCF to form an SCF solution, wherein the growth retardant compound includes at least one functional group or portion that is SCF-philic and at least one functional group or portion that is SCF-phobic or solute material-philic; and

expanding SCF solution across a pressure drop below the critical pressure of the SCF whereby the SCF decompresses and causes supersaturation and nucleation of particles comprising the solute material, said particles having a smaller size and a reduced amount of agglomeration than if no growth retardant compound was present.

16. The method according to claim 15 wherein the SCF is supercritical carbon dioxide.

17. The method according to claim 16 wherein the growth retardant compound is selected from the group consisting of sugar acetates, fluorocarbons and block copolymers.

18. The method according to claim 17 wherein the block copolymer is comprised of polymer blocks selected from the group consisting of polypropylene oxide, polyethylene oxide, poly methacrylic acid (PMMA), poly acrylic acid (PAA), poly vinyl acetate (PVA) and polyethylene oxide (PEO).

19. The method according to claim 15 wherein the solute material is selected from the group consisting of medicinal agents, biologically active materials, sugars, viral materials, diagnostic aids, nutritional materials, proteins, peptides, animal extracts, plant extracts and combinations thereof.

20. The method according to claim 19 wherein the solution further comprises a second solute material selected from the group consisting of polymers, fillers, disintegrants, binders, solubilizers, excipients, and combinations thereof. In particular, the matrix materials can be, for example, polysaccharides, polyesters, polyethers, polyanhydrides, polyglycolides (PLGA), polylactic acids (PLA), polycaprolactones (PCL), polyethylene glycols (PEG), polypeptides and combinations thereof.

21. The method according to claim 20 wherein the particles have an average particle size of less than 10 micron and more than 300 nm.